



How to choose the best planting material to obtain a maximal crop¹

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Abstract:

With more than 17 million tons CPO produced per year, Indonesia tops the world palm oil industry. But numerous critics tarnish this success story. One of them points the persistent gap between the performance of the new planting material and the poor yield performance averaging Indonesia and Malaysia.

As the success of an oil palm plantation is a long term race, this paper would like propose some solutions to achieve the prominent goal challenging the industry: **be sustainable**.

- ✚ Have the best possible knowledge of the environment of the future plantation or improve its knowledge on the agro-environmental conditions of the plantations having to be replanted and implement the better preparation practices
- ✚ Choose with open eyes your seed provider to obtain high quality seeds
- ✚ Monitor by himself the time-schedule
- ✚ Have a top-level preparation of planting material

Thus, can be summarised the magic square opening the doors of the success that drives to the expected 7 to 9 tons of CPO / ha / year.

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2. Introduction

Until now, the world demand for palm oil was highly determined by its consumption for food, insuring an annual grown of 1.6% since 1960. In 2006 – 2007, the Asian countries represent 50% of the world consumption with an estimation of 4.735 million tons for the sole Indonesia. Indonesia (17.2 million tons CPO) and Malaysia (16.5 million tons CPO) are far in front of the other producing countries (Jacquemard et al, 2006; USDA, 2007). The growth of the Indonesian Oil Palm Industry needs more than 100 millions seeds per year (DPSP, 2006).

In response to the numerous critics done on his quick expansion to the depends on tropical forest endangering wild life and surrounding communities, the Indonesian Oil Palm Industry is paying more attention to the development of stricter codes of practices for sustainable palm oil production. She supports actively the multi-stakeholder dialogue forum, the Roundtable for Sustainable Palm Oil (RSPO) (Baskett and Jacquemard, 2005).

But, the persistent gap between the performance of the new planting materials, with improvements in yield performance averaging 1% per year, now 5 to 9 tons CPO / ha / year (Dumortier, 2003, Durand-Gasselin et al, 2006b, Escobar and Alvarado, 2004, Jacquemard et al, 2003, Jacquemard 2007; Purba et al, 2003, Rajanaidu and Kushairi, 2003) and the poor commercial yield performance averaging countries like Indonesia and Malaysia (Corley, 2005) remains questionable.

The success of an oil palm plantation is a long term race. The challenge for the Oil Palm Industry could be summarise as follow:

- ✚ Have the best possible knowledge of the environment of the future plantation or improve its knowledge on the agro-environmental conditions of the plantations having to be replanted and implement the better preparation practices
- ✚ Choose with open eyes your seed provider to obtain high quality seeds
- ✚ Monitor by himself the time-schedule
- ✚ Have a top-level preparation of planting material



3. Have the best knowledge about the future estate or your current conditions and implement the best developed practices (BDPs)

Before establishing a plantation, it is advisable to carry out a feasibility study. The study should take into account agro-ecological, geographical, economic and social factors. Its extent and the design of the layout will depend on the scale of the project, but it should always be carried out by specialists (Jacquemard, 1998).

This study should be implemented according to the RSPO principles and criteria² through their national interpretation including the study of the environmental impact assessment (SEIA), the selection of suitable site for plantation developments in term of soil, slope and water resources and make available at all levels the appropriate documentation for meticulous operating procedures (Fairhurst and Härtler, 2003; RSPO, 2006).

The usage of the BDPs drives the industry to protect not only the physical environment such as the air, the soil and water, but also to integrate in his daily management the impact of the usage of the pesticides, fertilizers, the mastery of the soil fertility, the maintains of a useful agricultural biodiversity, etc(Chan Kook Weng, 2005).

Such set of information should help also the planter to place more precise orders to theirs seeds providers.

4. Choose with open eyes a reputable seed provider to obtain high quality seeds

Seed quality is one of the essential points that guarantee the economic success of plantations (RSPO, 2006). It is of crucial importance to growers.

The seed quality is a cumulative outcome of complementary approaches including (Durand – Gasselin et al, 2006a):

- ✚ A genetic improvement programme that allows a constant and regular genetic progress
- ✚ A seed production strategy that incorporated fully this genetic progress
- ✚ A strict processing and acute know – how to produce seeds

² The full set of RSPO Principles and Criteria is available in annexe



In application of these approaches and as example, PT Socfindo designed a four steps strategy (Jacquemard et al, 2006):

- + Creation and maintenance of the genetic resources
- + Permanent variety creation
- + Continuous exploitation of the creation
- + Non-stop improvement of the seed production

To achieve the goal (breeding improvement of 1% per year), the requirement of this strategy is to plant regularly progeny trials accompanied by their parental garden. In addition the annual revision of the seed production allows the adaptation to the demand and the permanent improvement of the planting material proposed to the customer. The figures 1 and 2 summarise the process:

Figure 1: Elementary unit of breeding scheme

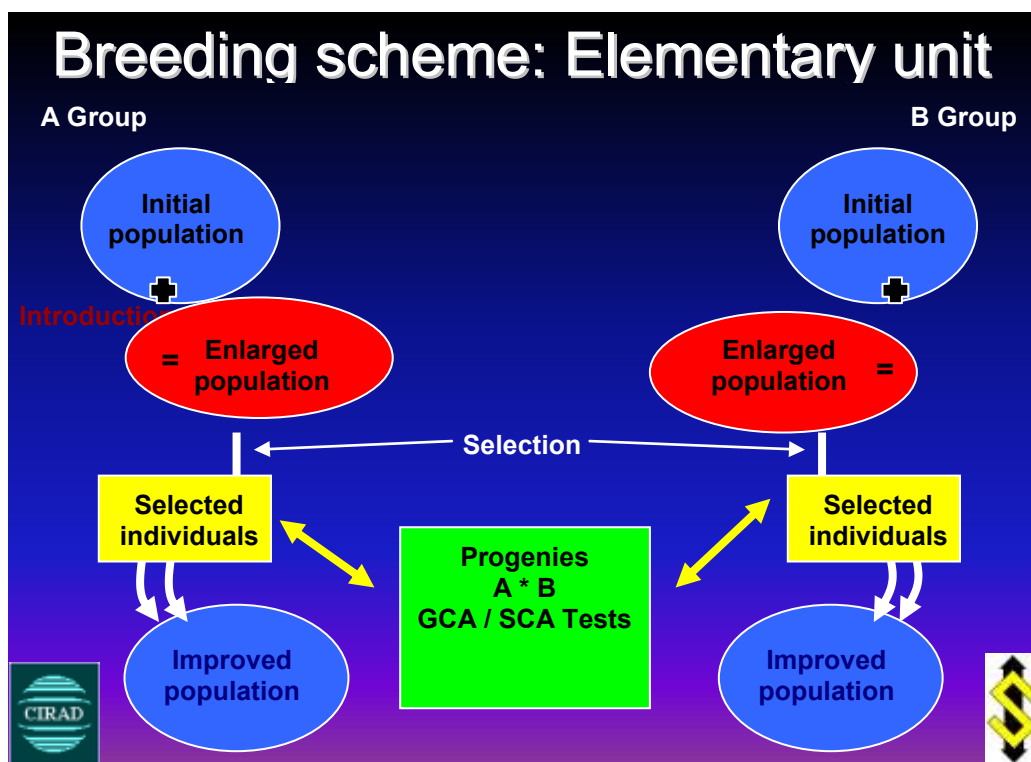
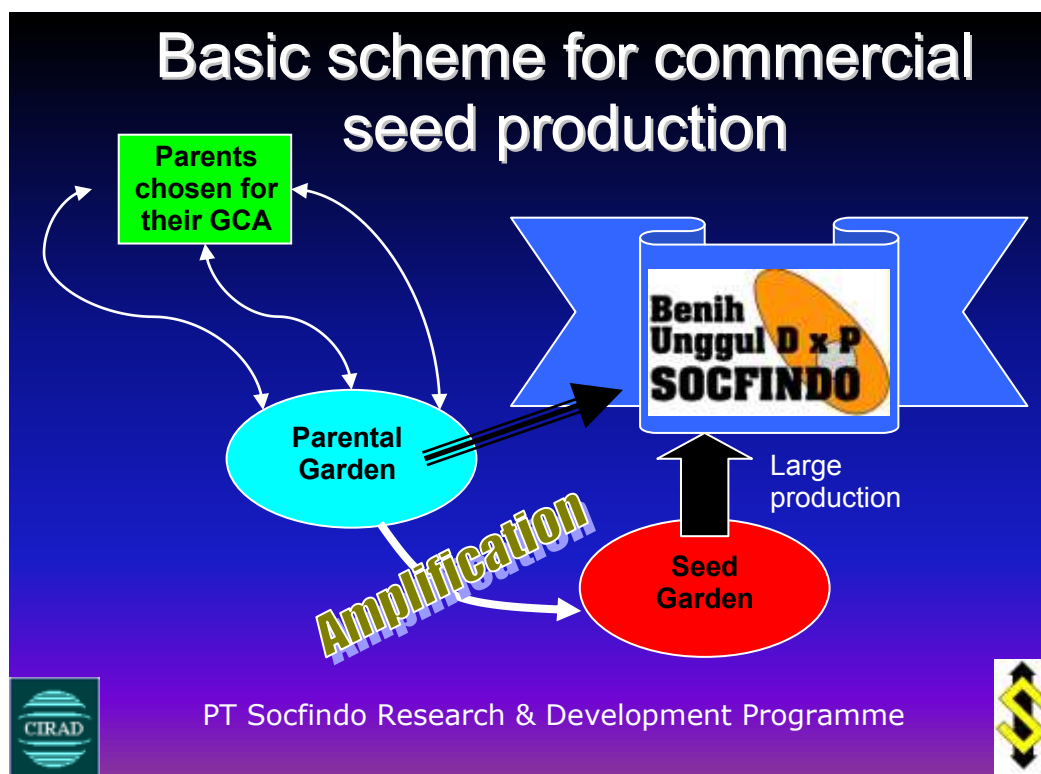




Figure 2: Basic scheme for commercial seed production



All the procedures were scrutinised and PSBB was qualified ISO 9001 - 2000 in November 2001. The seed production programme is built on the exploitation of the general combining abilities of the parents detected as well in the Cirad network as in the genetic blocks of Aek Kwasan I and Aek Loba Timur.

The proposed planting material is constituted at 74 % of Deli * La Mé categories and 26 % of Deli * Yangambi categories. The characteristics of the planting material are averaging:

- ✚ Seeds quality:
 - i. Purity: 99.9% of tenera palms
 - ii. Quality backed and standardised through ISO 9001 – 2000 procedures
- ✚ Production (North Sumatra – NAD conditions):
 - i. FFB: 28 to 32 tons / ha / year
 - ii. OER: ≥ 26 %
 - iii. CPO: 7 – 9 tons / ha /year
- ✚ Oil Quality:
 - i. Iodine value: ≥ 54 %
 - ii. RBD olein: > 76.9 %
 - iii. B Carotene: ≥ 500 ppm

Unfortunately, particularly in such periods of high demand, it is not rare to see unscrupulous or ignorant middlemen who produce “false” seeds or



seedlings eroding the future profitability of their customers with so-called cheaper planting material.

The potential of such material is reduced to less than 40 % of commercial planting material proposed by the reputable seed producers (Jacquemard et al, 2006).

5. Monitor properly the time schedule

The realisation objectives of the plantation programs can not in any case be piloted by uniquely financial or economical considerations. In fact, it is shown by all that a poorly prepared plantation, poorly realized and using bad quality seedlings endangers the long term profitability and then the sustainability of the estate. Establish a correct time schedule of the operation is essential for the success.

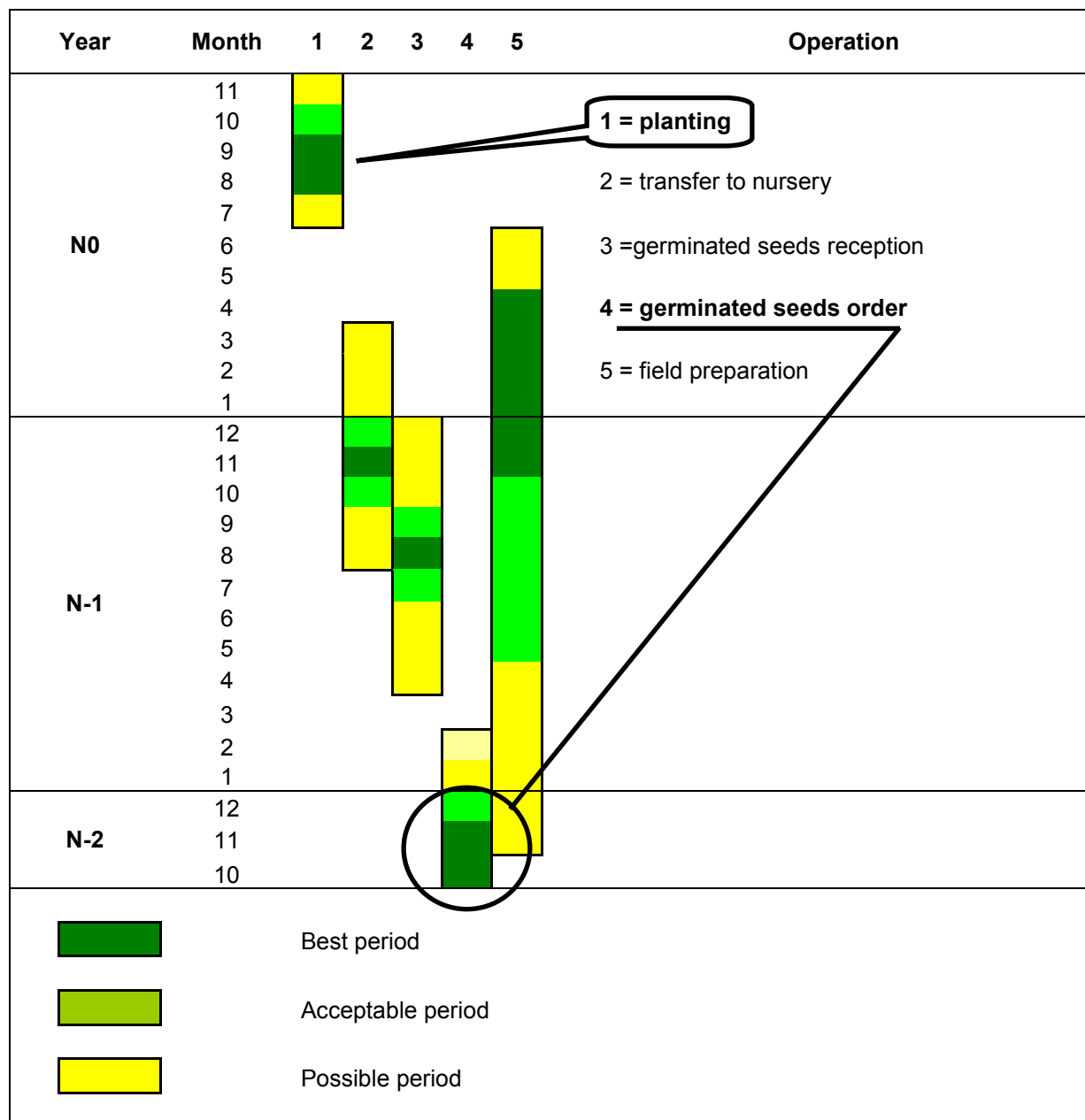
That starts with a specific evaluation of the company technical capacities to realize the preparation and the plantation of a certain area each year, while taking into account all the constraints. Among these constraints, it does necessary to take in account the favourable period of planting. An out timing planting has all the lucks to see its precocity reduced and its yield potential to diminish of 10 to 15% during a very long period. It is necessary to compare this technical evaluation to the feasibility study and take the adequate decisions.

Ideally, the good period of planting must start at the beginning of wet season, as soon as a minimum of 10 rainy days combining 100 mm was recorded within 3 weeks and should finish itself at least 1 month before the estimated return of the dry season.

From there, it is necessary to place the order of the planting material – generally germinated seeds - with its suppliers sufficiently early in advance so that the planting operation of the seedlings can do itself during the foreseen period.



The table 1 gives an example of operation calendar managing an August – November planting programme.



6. Have a good preparation of the planting material

Without returning on the nursery practices themselves that all knows, we propose you to put the accent on the necessary quality control:

Reception and planting out of the germinated seeds



The germinated seeds must be planted as quickly as possible after their reception. They must have well differentiated radicle and plumule.

It is necessary to effectuate:

- + A precise checking of the quality of the received seeds (number, broken, absent and abnormal germs, etc)
- + A verification of the categories identity by comparison of the labels of the bags and expedition forms
- + A transfer by qualified personnel
- + It is necessary to prohibit any mix in a same batch in the prenursery board different dates and categories.

The Socfindo customers receive a free bonus of 3% to compensate eventual losses, notably absence of growth, at this level of the operations. In case of abnormal rate of non growth, it is necessary to contact the supplier.

Preparation of the transfer in nursery

The transfer in nursery does itself when the seedlings have 3 to 4 leaves. The main recommendations are:

- + The selection must be done by qualified personnel by category and by dates of prenursery planting
- + All abnormal, sicker or injured seedlings must be destroyed under supervision
- + It is definitely dissuaded to put aside these seedlings in the hope to transfer them later. They will be able to give only weak production potential trees
- + The transfer in nursery must be done in respect the reception date of the germinated seeds and the identity of the categories

The percentage of non grown germinated seeds, dead and abnormal seedlings does not must exceed 15% at this stage.

Preparation of the transfer to the field

The main recommendations for a good quality control are:

- + The culling of the plants must be begun as soon as the first pinnately divided leaves appear
- + The culling must be done by qualified personnel
- + The culling is made by dates of transfer and by category
- + The abnormal seedlings (too small or too big), the sick and the injured ones are identified by coloured sticks
- + The final culling is achieved 7 - 8 month after the transfer in nursery under supervision.
- + The culled seedlings are destroyed under supervision



- + It is definitely dissuaded to put aside these culled seedlings in the hope to transfer them later in the field for the same reason than above
- + The plantation in the field does itself respect as possible the identification by category

In a well managed nursery, the elimination rate is inferior to 10%

7. Conclusion

These four cards form the magic square that must allow the planters to achieve their goal. This is to this only condition that it will be possible to reduce the productivity gap of between the average of the country and the genetic potential created by the R & D programmes. 7 to 9 oil tons of CPO / hectare / year are not reserved to few companies. The doors of the success are widely opened. Thus, the companies will assure the success of their business and a sustainable development of oil palm industry in Indonesia

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Roundtable on Sustainable Palm Oil

RSPO Principles and Criteria for Sustainable Palm Oil Production

Public release version

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Roundtable on Sustainable Palm Oil

Principles and Criteria for Sustainable Palm Oil Production

Preamble

As members of the Roundtable on Sustainable Palm Oil (RSPO), we are embarking together on a long journey. We endorse these principles and criteria as the best approach to sustainable palm oil production in the light of current knowledge. Members will support each other in good faith in applying the principles and criteria to as great an extent as possible. In addition, members from the various sectors of RSPO will actively promote the use of sustainable palm oil.

Sustainable palm oil production is comprised of legal, economically viable, environmentally appropriate and socially beneficial management and operations. This is delivered through the application of the following set of principles and criteria, and the accompanying draft guidance and definitions.

There is no genetically modified (GM) palm oil available in the market, and there will not be for many years to come. Hence no criterion on GM oil palm is included.

These criteria will be applied for an initial pilot implementation period of two years from the date of adoption, and will be reviewed at the end of this period. The objective of the pilot implementation period is to enable field testing of the principles and criteria, and thereby allow guidance to be improved. Guidance for application of the principles and criteria by smallholders will be an important aspect of this. During this initial period, national interpretations will also be developed.

No public claims relating to compliance with the RSPO principles and criteria can be made without third party verification and authorisation by RSPO.

Principles and Criteria

Principle 1: Commitment to transparency

Criterion 1.1 Oil palm growers and millers provide adequate information to other stakeholders on environmental, social and legal issues relevant to RSPO Criteria, in appropriate languages & forms to allow for effective participation in decision making.

Criterion 1.2 Management documents are publicly available, except where this is prevented by commercial confidentiality or where disclosure of information would result in negative environmental or social outcomes

Principle 2: Compliance with applicable laws and regulations

Criterion 2.1 There is compliance with all applicable local, national and ratified international laws and regulations



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Criterion 2.3 Use of the land for oil palm does not diminish the legal rights, or customary rights, of other users, without their free, prior and informed consent

Principle 3: Commitment to long-term economic and financial viability

Criterion 3.1 There is an implemented management plan that aims to achieve long-term economic and financial viability.

Principle 4: Use of appropriate best practices by growers and millers

Criterion 4.1 Operating procedures are appropriately documented and consistently implemented and monitored.

Criterion 4.2 Practices maintain soil fertility at, or where possible improve soil fertility to, a level that ensures optimal and sustained yield.

Criterion 4.3 Practices minimise and control erosion and degradation of soils.

Criterion 4.4 Practices maintain the quality and availability of surface and ground water.

Criterion 4.5 Pests, diseases, weeds and invasive introduced species are effectively managed using appropriate Integrated Pest Management (IPM) techniques.

Criterion 4.6 Agrochemicals are used in a way that does not endanger health or the environment. There is no prophylactic use, and where agrochemicals are used that are categorised as World Health Organisation Type 1A or 1B, or are listed by the Stockholm or Rotterdam Conventions, growers are actively seeking to identify alternatives, and this is documented.

Criterion 4.7 An occupational health and safety plan is documented, effectively communicated and implemented.

Criterion 4.8 All staff, workers, smallholders and contractors are appropriately trained.

Principle 5: Environmental responsibility and conservation of natural resources and biodiversity

Criterion 5.1 Aspects of plantation and mill management that have environmental impacts are identified, and plans to mitigate the negative impacts and promote the positive ones are made, implemented and monitored, to demonstrate continuous improvement.

Criterion 5.2 The status of rare, threatened or endangered species and high conservation value habitats, if any, that exist in the plantation or that could be affected by plantation or mill management, shall be identified and their conservation taken into account in management plans and operations.



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- Criterion 5.3 Waste is reduced, recycled, re-used and disposed of in an environmentally and socially responsible manner.
- Criterion 5.5 Use of fire for waste disposal and for preparing land for replanting is avoided except in specific situations, as identified in the ASEAN guidelines or other regional best practice.
- Criterion 5.6 Plans to reduce pollution and emissions, including greenhouse gases, are developed, implemented and monitored.

Principle 6: Responsible consideration of employees and of individuals and communities affected by growers and mills

- Criterion 6.1 Aspects of plantation and mill management that have social impacts are identified in a participatory way, and plans to mitigate the negative impacts and promote the positive ones are made, implemented and monitored, to demonstrate continuous improvement.
- Criterion 6.2 There are open and transparent methods for communication and consultation between growers and/or millers, local communities and other affected or interested parties.
- Criterion 6.3 There is a mutually agreed and documented system for dealing with complaints and grievances, which is implemented and accepted by all parties.
- Criterion 6.4 Any negotiations concerning compensation for loss of legal or customary rights are dealt with through a documented system that enables indigenous peoples, local communities and other stakeholders to express their views through their own representative institutions.
- Criterion 6.5 Pay and conditions for employees and for employees of contractors always meet at least legal or industry minimum standards and are sufficient to meet basic needs of personnel and to provide some discretionary income.
- Criterion 6.6 The employer respects the right of all personnel to form and join trade unions of their choice and to bargain collectively. Where the right to freedom of association and collective bargaining are restricted under law, the employer facilitates parallel means of independent and free association and bargaining for all such personnel.
- Criterion 6.7 Child labour is not used. Children are not exposed to hazardous working conditions. Work by children is acceptable on family farms, under adult supervision, and when not interfering with education programmes.



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- Criterion 6.8 The employer shall not engage in or support discrimination based on race, caste, national origin, religion, disability, gender, sexual orientation, union membership, political affiliation, or age.
- Criterion 6.9 A policy to prevent sexual harassment and all other forms of violence against women and to protect their reproductive rights is developed and applied.
- Criterion 6.11 Growers and millers contribute to local sustainable development wherever appropriate.

Principle 7: Responsible development of new plantings

- Criterion 7.1 A comprehensive and participatory independent social and environmental impact assessment is undertaken prior to establishing new plantings or operations, or expanding existing ones, and the results incorporated into planning, management and operations.
- Criterion 7.2 Soil surveys and topographic information are used for site planning in the establishment of new plantings, and the results are incorporated into plans and operations.
- Criterion 7.3 New plantings since November 2005 (which is the expected date of adoption of these criteria by the RSPO membership), have not replaced primary forest or any area containing one or more High Conservation Values.
- Criterion 7.4 Extensive planting on steep terrain, and/or on marginal and fragile soils, is avoided.
- Criterion 7.5 No new plantings are established on local peoples' land without their free, prior and informed consent, dealt with through a documented system that enables indigenous peoples, local communities and other stakeholders to express their views through their own representative institutions.
- Criterion 7.6 Local people are compensated for any agreed land acquisitions and relinquishment of rights, subject to their free, prior and informed consent and negotiated agreements.
- Criterion 7.7 Use of fire in the preparation of new plantings is avoided other than in specific situations, as identified in the ASEAN guidelines or other regional best practice.

Principle 8: Commitment to continuous improvement in key areas of activity

- Criterion 8.1 Growers and millers regularly monitor and review their activities and develop and implement action plans that allow demonstrable continuous improvement in key operations